he endowed to the extent of 100,000*l*. He was twice married—first, in 1825, to Fanny, youngest daughter of Mr. Richard Ankers; then, in 1871, to Mary Louisa, widow of Mr. Alfred Orrell. Notwithstanding his unwearied attention to business, he contrived to have some leisure time, and he spent it very agreeably at his estate of Stancliffe, in Derbyshire, where he devoted himself to landscape gardening. He also derived a great deal of pleasure from his horses and his herd of short-horns. For some time his health had been failing, and until lately he went every winter to the Riviera. Two years ago he made for himself at Stancliffe a winter garden, hoping that he might thus be able to spend the winter at home. Last year he went abroad again, and now, at the age of eighty-three, his long and great career has come to an end. The whole civilised world may be said to be familiar with his name, and he will always be remembered as the most illustrious English mechanician of the present age. Few men of his time have done more for the nation than Whitworth. His "Scholarships" have had the most important influence upon the knowledge and training of the rising generation of engineers. There are now nearly 200 Whitworth Scholars throughout the land, and they will doubtless be largely represented at his funeral.

NOTES

SINCE our last week's number was issued, Prof. Huxley has sent an important letter to the *Times* on the subject of the true functions of the Imperial Institute. From this letter we make the following extract:—"That with which I did intend to express my strong sympathy was the intention which I thought I discerned, to establish something which should play the same part in regard to the advancement of industrial knowledge which has been played in regard to science and learning in general, in these realms, by the Royal Society and the Universities. I pictured the Imperial Institute to myself as a house of call for all those who are concerned in the advancement of industry; as a place in which the home-keeping industrial could find out all he wants to know about colonial industry and the colonist about home industry; as a sort of neutral ground on which the capitalist and the artisan would be equally welcome; as a centre of intercommunication in which they might enter into friendly discussion of the problems at issue between them, and, perchance, arrive at a friendly solution of them. I imagined it a place in which the fullest stores of industrial knowledge would be made accessible to the public; in which the higher questions of commerce and industry would be systematically studied and elucidated; and where, as in an industrial University, the whole technical education of the country might find its centre and crown. If I earnestly desire to see such an institution created, it is not because I think that or anything else will put an end to pauperism and want—as somebody has absurdly suggested—but because I believe it will supply a foundation for that scientific organisation of our industries which the changed conditions of the times render indispensable to their prosperity. I do not think I am far wrong in assuming that we are entering, indeed have already entered, upon the most serious struggle for existence to which this country has ever been committed. The latter years of the century promise to see us embarked in an industrial war of far more serious import than the military wars of its opening years. On the east, the most systematically instructed and best informed people in Europe are our competitors; on the west, an energetic offshoot of our own stock, grown bigger than its parent, enters upon the struggle possessed of natural resources to which we can make no pretension, and with every prospect of soon possessing that cheap labour by which they may be effectually utilised. Many circumstances tend to justify the hope that we may hold our own if we are careful to 'organise victory.' But, to those who reflect seriously on the prospects of the population of Lancashire and Yorkshire—should the time ever arrive when the goods which are produced by their labour and their skill are to be had cheaper elsewhere—to those who remember the cotton famine and reflect how much worse a customer famine would be, the situation appears very grave. I thought—I still think—that it was the intention of the Prince of Wales and his advisers, recognising the existence of these dangers ahead, to make a serious effort to meet them, and it was in that belief that I supported the proposed Institute." We are glad to see that in the pamphlet which is now being circulated by the organisers of the Imperial Institute it is acknowledged that in this communication Prof. Huxley "has clearly defined the functions of the Imperial Institute as recognised by the propounders of the scheme."

THE Royal Society of New South Wales offers its medal and a prize of 25*l*. for the best communication (provided it be of sufficient merit) containing the results of original research or observation upon any one of a list of subjects which it has published. Communications on the following subjects must be sent in not later than May 1 next:—On the silver ore deposits of New South Wales; origin and mode of occurrence of gold-bearing veins and of the associated minerals; influence of the Australian climate in producing modifications of diseases; and on the Infusoria peculiar to Australia. A year later the Society will receive papers on the anatomy and life-history of the Echidna and Platypus; the anatomy and life-history of Mollusca peculiar to Australia; and the chemical composition of the products from the so-called kerosene shale of New South Wales. The subjects on which communications must be sent in not later than May 1, 1889, are:—On the chemistry of the Australian gums and resins; on the aborigines of Australia; on the iron ore deposits of New South Wales; list of the marine fauna of Port Jackson, with descriptive notes as to habits, distribution, &c. The competition is open to all without any restriction whatever, excepting that a prize will not be awarded to a Member of the Council for the time being; neither will an award be made for a mere compilation, however meritorious in its way. The communication to be successful must be either wholly or in part the result of original observation or research on the part of the contributor.

THE Compagnie du Congo pour le Commerce et l'Industrie is organising an expedition, composed of geologists and others, for the exploration of the Upper Congo and its tributaries.

WE regret to announce the death of Mr. Edward Livingstone Youmans, a well-known American writer on science. Mr. Youmans was born in New York in 1821, and though suffering much from defective vision, prosecuted from his early youth the study of science. He became well known as a public lecturer. He planned the "International Scientific Series" in 1871, in connection with which he made several visits to Europe. In 1872 he established the *Popular Science Monthly* in New York. Mr. Youmans died on Thursday last, January 20.

IT is sometimes said that intellectually Scotland does not stand on so high a level as in former times. This may be true so far as literature is concerned, but it is certainly not true with regard to science. At a recent meeting of the Royal Society of Edinburgh Mr. John Murray, of the *Challenger*, one of the Vice-Presidents, declared that he questioned whether any country in the world, taking its size into consideration, could show a better record of scientific work or a greater mass of scientific literature than Scotland during the past ten or twenty years. In making this statement Mr. Murray's object was not to glorify his own country but to show that its scientific establishments have a solid claim to better treatment than they have hitherto received at the hands of the Government. Money grants, he stated, of considerable annual value are devoted to the maintenance of learned Societies in London and Dublin. In Scotland, according to Mr.

Murray, the only grant of the kind is 300*l.* annually to the Royal Society of Edinburgh, and this is repaid to a Government Department in the form of rent. With regard to London, Mr. Murray, we think, should verify his references, as we know of no Society which receives "a money grant of considerable value."

THE death is announced of M. Feil, the well-known glass-founder, who prepared so many disks for the large telescopes in use in several Observatories; and of M. Mercadier, Professor of Physics to the Polytechnic School of Paris, and author of the only French book on electrical measures. M. Feil was seventy-four years of age; M. Mercadier ten years younger.

THE French are making use of their occupation of Madagascar to gain a thorough knowledge of the natural history of the island. There have already issued from the national press several fascicules of a magnificent "Histoire physique, naturelle, et politique de Madagascar," edited by M. Alfred Grandidier, to be completed in thirty volumes quarto. The subjects to be comprised in this work are: (1) physical and astronomical geography; (2) meteorology and magnetism; (3) ethnology, anthropology, and linguistics; (4) political, colonial, and commercial history; (5) natural history of mammals; (6) natural history of birds; (7) natural history of fishes; (8) natural history of reptiles; (9) natural history of Crustacea; (10) natural history of terrestrial and freshwater mollusks; (11) natural history of plants; (12) geology and palæontology. The various sections are intrusted to competent authorities; and the geological portion is to be illustrated by about 500 chromolithographs or coloured plates, the anatomical details being represented in lithography and photography. The total number of plates will not be less than 1200.

PREPARATIONS for the first general meeting, at Rome, of the International Statistical Institute are being made by the Executive Committee, consisting of Sir Rawson W. Rawson, K.C.M.G., C.B. (the President), M. E. Levasseur and Prof. von Neumann-Spallart (Vice-Presidents), Signor Luigi Bodio (General Secretary), and Mr. John Biddulph Martin (Treasurer). The arrangements will be announced by the Committee in due course.

ON Friday evening last an important lecture on "Modern War-Ships" was delivered at the Mansion House by Mr. W. H. White, Director of Naval Construction and Assistant Controller of the Navy. The lecture, which was illustrated by diagrams and models, was one of a series given by members of the Company of Shipwrights. Mr. White's object was to place before the meeting facts and figures illustrating the progress of war-ship building in recent years, and he confined his attention almost exclusively to the period between 1859, when the ironclad reconstruction of the Royal Navy began, and the present year. He presented a very lucid and interesting account of the extraordinary changes which have taken place during this time in the methods of war-ship building.

DR. HOPKINSON'S account of the electric lighthouses of Macquarie and of Tino, which was read before the Institution of Civil Engineers last month, has just been issued in pamphlet form, with a report of the oral and written discussion to which it gave rise.

IT is stated that the Lake District in New Zealand is showing signs of fresh disturbances. Tremors have been felt at Rotorua, and Tarawera has emitted dense volumes of steam. The Wahanga Peak appeared most active. No fire was visible, and after this outburst everything quieted down again.

WE have before us the first number of the "Bulletin of Miscellaneous Information," issued from the Royal Gardens, Kew. The "Bulletin" will appear from time to time as an occasional publication, and will contain notes, too detailed for the Annual Report, on economic products and plants to which the attention of the staff of the Royal Gardens has been drawn in the course of ordinary correspondence, or which have been made the subject of particular study at Kew. These notes will serve the purpose of an expeditious mode of communication to the numerous correspondents of Kew in distant parts of the Empire, and they will be useful to members of the general public interested in planting or agricultural business in India and the colonies. The present number contains much valuable information about Teff, one of the cereals indigenous to Abyssinia, and about Oil of Ben.

MESSRS. GINN AND CO., publishers, Boston, U.S.A., are about to issue a *Journal of Morphology*, which will be devoted principally to embryological, anatomical, and histological subjects. Mr. C. O. Whitman, Milwaukee, Wis., will be the editor. For the present only two numbers a year will be issued. The agent for Great Britain is Mr. W. P. Collins.

MESSRS. DE LA RUE AND CO. have in the press the second volume of "A Treatise on Electricity and Magnetism (Methods of Measurement and Applications)," by E. Mascart, Professor in the Collège de France, and Director of the Central Meteorological Bureau, and J. Joubert, Professor in the Collège Rollin. The work is translated by Dr. E. Atkinson, Professor of Experimental Science in the Staff College.

MESSRS. CASSELL AND CO. have just issued the first part of "Our Earth and its Story," a serial which will be completed in thirty-six parts, and they are about to publish "Practical Electricity," by Prof. Ayrton.

M. BÉCLARD has presented some interesting statistics to the Academical Council of Paris on the number of female students in the Faculty of Medicine in the University there. He reports that since Germany closed the doors of its Universities to women, the number in Paris has been constantly increasing. At present the numbers of the various nationalities are: Russians 83, English 11, French 7, Americans 3, Austrians 2, Roumanian 1, and Turk 1. The greater number of these do not pursue their studies as far as the doctor's degree. The large proportion of Russian ladies is due to the closing of the female medical school recently founded at St. Petersburg. M. Béclard thinks that the number of students has now reached the maximum, and will probably decline, since the preliminary studies of the Faculty for both sexes have been made alike.

ALTHOUGH the competition which takes place annually for the vacancies in the assistantships in the Paris hospitals is not over, it is known that among the *internes* whose names will be published in some days, there will be one woman. Miss Klumpke is the first woman who has successfully competed for the *concours de l'internat.* In the written examination she ranked second (*ex æquo* with one or two others). She obtained 27 marks, the maximum being 30, and the highest number secured being 28. A good deal of grumbling is going on among the students. The idea of being distanced by a woman is not agreeable to them. Miss Klumpke has done very good work in neuro-pathology, and her name is known to all who study this branch of medicine.

THERE are at present nine female students at the Upsala University, three of whom study medicine, five philosophy, and one jurisprudence.

THE Aquarium constructed by the Executive of the Fisheries Exhibition in 1883 has just been sold by the Royal Commissioners by public auction, the property realising 100*l.* in the aggregate. Until recently it was expected that this Aquarium would be maintained as a part of the Buckland Museum. Many of the fish with which it made the British public familiar were hatched from ova of foreign fish. There were various Transatlantic forms; and fishes indigenous to India, China, Brazil, Austria, and many other countries were exhibited. Considering the fact that this Aquarium was the only one in London worthy of note, naturalists and the public have good reason to regret that it has been abolished.

MR. Z. NUTTALL, of the Peabody Museum, Cambridge, Mass., has been led to some interesting results by the study of the Mexican codices. Familiarity with certain phonetic symbols of frequent recurrence in these picture-writings enabled him to perceive that identical symbols are reproduced on the so-called Calendar Stone, the Sacrificial Stone, and other equally well-known Mexican monoliths. The Calendar Stone was, he maintains, the Market Stone of the city of Mexico, and he thinks that from the fixed market days recorded on it the Mexican calendar system may have sprung. The so-called Sacrificial Stone seems to him to have been a Law Stone, recording the periodical collection of certain tributes paid by subjugated tribes, and by others whose obligation it was to contribute to the common wealth of Mexico. Mr. Nuttall expresses his belief that many of the large stone receptacles which are generally called "vessels for containing the hearts and blood of human victims," were in reality standard measures kept for reference in the market place.

WE regret to hear of the death of Dr. Julius Lüttich, the well-known astronomer, who died in Rome on January 3; also of Prof. Jean Louis Trasenster, who died on the same day. M. Trasenster was Professor of Engineering and Mining at the Liége University.

THE Report of the Kew Committee for 1886, lately published, shows that the well-known work of the Kew Observatory has been actively carried on during the year. To particularise in certain subjects, it may be mentioned that in the magnetic observations four notable magnetic disturbances were recorded, occurring severally in the months of January, March, July, and October, and that the diurnal range of the declination for the summer and winter seasons, as well as the whole year, is given in a table in the Appendix. In solar observations the results of sketches of sunspots in continuation of Schwabe's enumeration are also recorded in the Appendix. The adoption of a new graphic process for determining cloud heights and motions, devised by Prof. Stokes, has been very satisfactory in saving computation when reducing the photographic pictures. Whilst thus adding its valuable yearly contributions to science, the Observatory is becoming more and more useful in results of immediate utility to the general public. In this respect the rating of watches is a matter of growing convenience to those who require a good time-keeper accompanied with a trustworthy certificate as to the performance of the watch they are about to purchase. Chronometers are also now rated here, and from the 35 days' period of trial in a range of 30° of temperature to which these instruments are subjected by the staff of the Observatory, there is every reason to believe in the ascertained rates. It is encouraging to note that increasing good work points to the necessity for enlarging the existing accommodation afforded by the buildings.

WE have received the third volume of the Proceedings and Transactions of the Royal Society of Canada. It relates to the year 1885. Among the scientific articles may be mentioned "The Artistic Faculty in Aboriginal Races" and "Palæolithic Dexterity," by Dr. Daniel Wilson; "A Natural System in Mineralogy, with a Classification of Native Silicates," by Dr. T. Sterry Hunt; "The Mesozoic Floras of the Rocky Mountain Region," by Sir W. Dawson; "Illustrations of the Fauna of the St. John Group, continued," by Mr. G. F. Matthew; "Catalogue of Canadian Butterflies, with Notes on their Distribution," by Mr. W. Saunders; and "The Skull and Auditory Organ of the Siluroid Hypophthalmus," by Mr. R. Ramsay Wright.

AN elaborate paper on "The Right Hand and Left-Handedness" was lately read before the Royal Society of Canada by Dr. Daniel Wilson, President of University College, Toronto. His final conclusion on this difficult subject, which he has repeatedly discussed from various points of view, is, that left-handedness is due to an exceptional development of the right hemisphere of the brain. Dr. Wilson, who is himself left-handed, concludes his paper with the expression of a hope that after his death his own brain may be "turned to account for the little further service of settling this physiological puzzle." "If my ideas are correct," he says, "I anticipate as the result of its examination that the right hemisphere will not only be found to be heavier than the left, but that it will probably be marked by a noticeable difference in the number and arrangement of the convolutions."

THE additions to the Zoological Society's Gardens during the past week include a White-whiskered Swine (*Sus leucomystox* ♀) from Loochoo Islands, presented by Mr. H. Pryer, C.M.Z.S; two Blackiston's Eagle Owls (*Bubo blackistoni*) from Yesso, Japan, presented by Mr. J. H. Leech, F.Z.S.; two Schlegel's Doves (*Chalcopeliæ puella*) from West Africa, presented by Mr. H. C. Donovan; a Macaque Monkey (*Macacus cynomolgus*) from India, a Suricate (*Suricata tetradactyla*) from South Africa, deposited; a Red Kangaroo (*Macropus rufus* ♀), a Yellow-footed Kangaroo (*Petrogale xanthopus* ♀), born in the Gardens.

OUR ASTRONOMICAL COLUMN

THREE NEW COMETS.—The discovery of a great comet is telegraphed from several southern Observatories. So far as is yet known it was discovered by Mr. Thome at Cordoba on January 18. It was then situated in the constellation Grus; apparently not far from γ Gruis. On the following evening the tail only was seen at Melbourne, projecting some 30° above the south-western horizon. On January 20 it was remarked at Adelaide; here again the tail only was seen. In its physical appearance the comet strongly recalls the great southern comet of 1880, being long, narrow, and straight. It is not brilliant, though readily visible to the naked eye in the twilight. The tail was traced as far as α Toucani. It is expected that the comet will become very brilliant. The nucleus was observed at Adelaide and Melbourne on January 23. The Melbourne observation is as follows:—January 23d. 8h. 0m., R.A. 21h. 20m. 28s.; daily motion + 7m. 44s., Decl. 44° 17′ S., daily motion + 51′.

Another comet was discovered on January 22 by Mr. W. H. Brooks, of the Red House Observatory, Phelps, New York. Its place on that day at 6h. 54m. was R.A. 18h. 0m., Decl. 71° N. It was faint, and was moving slowly in an easterly direction. A third comet has been discovered by Mr. E. E. Barnard, Nashville, Tennessee; and observed at Harvard College as follows:—January 24d. 17h. 55·7m., R.A. 19h. 10m. 17·4s., daily motion + 2m. 36s., Decl. 25° 57′ 45″ N., daily motion − 0° 35′. The comet is faint.

NEW VARIABLES.—Mr. S. C Chandler, Jun., writes in Gould's *Astronomical Journal*, No. 149, to state that the period of the new variable of the Algol type, D.M. + 34° No. 4181, the discovery of which we announced last week (p. 282), is not yet precisely known. It is either 5·997d. or some aliquot part thereof, but not either the third or fifth part. The approximate elements supplied by Mr. Chandler are as follows:—

$$\text{1886 December } 9{\cdot}458\text{d. G.M.T.} + \left(\frac{5{\cdot}997\text{d.}}{n}\,\text{E}\right),$$

where n can be neither 3 nor 5. The period may therefore be about three days, one day and a half, or a shorter period still. An examination of the relation which the duration of the oscillation in the light of the other stars of the type bears to the whole period leads Mr. Chandler to conclude